

What is claimed is:

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1. A method for conducting chemical reactions between a solution of a chemical reactant and an array of functionalized binding sites on a support surface comprising adding the solution of chemical reactant to the functionalized binding site in an amount where the solution of chemical reactant at each binding site is separate from the solution of chemical reactant at other binding sites by surface tension.
 2. The method of claim 1 wherein the area of the support surface of the functionalized binding site has a higher surface tension relative to the support surface surrounding each functionalized binding site.
 3. The method of claim 1 wherein the support surface has $10-10^4$ functionalized binding sites per cm^2 .
 4. The method of claim 1 wherein the functionalized binding sites are about 50-2000 microns in diameter.
 5. The method of claim 1 wherein the volume of the solution of reagent(s) is 50 picoliter to 2 microliter.
 6. The method of claim 1 wherein the chemical reaction between the chemical reactant and functionalized binding site forms covalent bonds.
 7. The method of claim 1 wherein chemical reactant reacts with the functionalized binding site by non-covalent specific binding interactions.
 8. An array plate comprising a support surface with an array of distinct and separated functionalized binding sites and wherein the area of the functionalized binding sites has a higher surface tension relative to the support surface surround each functionalized binding site.
 9. The array plates of claim 8 wherein the support surface has 10 to 10^4 sites/ cm^2 functionalized binding sites per cm^2 .

10. The array plate of claim 8 wherein each functionalized binding site is about 50-2000 microns in diameter.

11. The array plate of claim 8 wherein the functionalized binding sites are functionalized with a reagent which forms a covalent chemical bond with the reagent.

12. The array plate of claim 8 wherein the functionalized binding sites are functionalized with a reagent that is a member of a specific binding pair.

13. A method for making array plates comprising:
- (a) coating a support surface with a positive or negative photoresist substance which is subsequently exposed to light and developed to create a patterned region of a first exposed support surface;
 - (b) reacting the first support surface with a fluoroalkylsilane to form a stable fluoroalkylsiloxane hydrophobic matrix on the first support surface;
 - (c) removing the remaining photoresist to expose a second support surface; and
 - (d) reacting the second support with a hydroxy or aminoalkylsilane to form derivatized hydrophilic binding site regions.

14. The method according to claim 13, wherein the fluoroalkylsiloxane is tetradecafluoro-1,1,2,2-tetrahydrooctyl siloxane.

15. A method for making array plates comprising:
- (a) reacting a support surface with a hydroxy or aminoalkylsilane to form a derivatized hydrophilic support surface;
 - (b) reacting the support surface from step (a) with o-nitrobenzyl carbonyl chloride as a temporary photolabile blocking to provide a photoblocked support surface;
 - (c) exposing the photoblocked support surface of step (b) to light through a mask to create unblocked areas on the support surface with unblocked hydroxy or aminoalkylsilane;

- 5 (d) reacting the exposed surface of step (c) with perfluoroalkanoyl halide or perfluoroalkylsulfonyl halide to form a stable hydrophobic (perfluoroacyl or perfluoroalkylsulfonamido) alkyl siloxane matrix; and
- (e) exposing this remaining photoblocked support surface to create patterned regions of the unblocked hydroxy- or aminoalkylsilane to form the derivatized hydrophilic binding site regions.

16. The method according to claim 15, wherein the siloxane is 3-perfluorooctanoyloxy propylsiloxane.

17. The method according to claim 15 wherein the siloxane is 3-perfluorooctanesulfonamido propylsiloxane.